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ABSTRACT

An award-winning fourth-grade unit combines computer and economics education by examining the impact of computer usage on various segments of the economy. Students spent one semester becoming familiar with a classroom computer and gaining a general understanding of basic economic concepts through class discussion, field trips, and bulletin boards. The 18-week unit then tied these economic concepts to computer usage as follows. Students examined: computers as suppliers of wants and needs and as solutions to labor problems (scarcity); computer technology's effect on the standard of living (economic goals); computers as capital goods (productive resources); the creation of a market for computers (market economy); financial uses of computers (financial institutions); computer related careers (circulation flow); increases in productivity through computers (resource extenders); the contribution of others to computer availability (economic interdependence); and deciding on computer use (decisionmaking). As a culminating activity, students developed an "economics quotient" test which was programmed for the computer and offered as part of an open house program. A program evaluation and bibliography are included. (LP)

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LEARNING TO LOVE YOUR COMPUTER

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A FOURTH GRADE STUDY IN THE USE OF COMPUTERS AND THEIR ECONOMIC IMPACT ON THE WORLD TODAY

BY

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INTRODUCTION

I happen to be doing this study about the economic effects of computers with my children due to a delightful set of circumstances.

For the past few years, ever since seeing an ad on TV for the TRS 80 Radio Shack Microcomputer priced at $500, I had secretly yearned for one for my classroom. This desire had remained buried in the back of my mind as I went about my teaching activities. One of these activities included teaching a unit on economics, which I entered in the Seventeenth Annual International Paper Company Foundation's Economic Education Awards Program, where I was fortunate enough to win second prize that included, coincidentally, $500!! My first thought on winning was "At last! My computer!"

Thus did this project begin, with the purchase of a TRS 80 Level I computer. Of course, this was only the beginning. I took a semester course at our local community college in Basic Programming (the language understood by our computer) and have also paid for some private instruction. Now appears another of those delightful circumstances - my school system paid my way to a workshop on Microcomputers in the Classroom that was held in Phoenix, Arizona. This workshop was put on by educators from Minnesota, a state that has pioneered the use of computers in education as well as the software written for educational purposes.

At this conference it became apparent that my TRS 80 Level I would not adequately do all I wanted it to do in my classroom situation, so at an expense of about $400 I had my machine "upgraded" to a Level II.

I learned quickly that writing programs for computers is not a skill easily acquired. I have written a few programs, but I purchased most of the programs I have for around $300. Because I believe so strongly

in the use of computers in education (the excitement of my children for our computer further enforces this belief) and because I've always enjoyed buying things for my classroom, I feel that this has been money well spent.

The first semester was spent getting acquainted with and using our computer in the classroom. One of the programs I purchased was one with artificial intelligence that allows the children to converse with the machine much like you would with a person. The program was entitled "Eliza". An isolated area was set up in the room for Eliza. A nearby bulletin board, consisting of a very feminine looking machine, carried the message "Eliza is coming!" I did not bring Eliza to the classroom until the second week of school. By this time they were very curious and excited. Word had gotten around from the students who had participated in the other Economics study who knew that I had purchased a computer with the prize money, and my class began to figure out who Eliza was. They were given a copy of Eliza's keyboard (very similar to a typewriter) to take home and practice on. I felt that conversing with Eliza at first would help acquaint them with the keyboard more easily than some of the other programs I had. So the first week that Eliza was there was spent with each child spending 15 minutes getting acquainted with her by way of the artificial intelligence program.

Every year in my room I have a behavior modification program whereby all the children apply for, and hold various jobs for a salary that is paid in play money. They are then able to spend this money at a monthly auction as well as being able to pay for assessed fines for misbehavior, late papers, etc. (This helps in understanding the circular flow a great deal.) I had used Eliza the summer preceding school in tutoring several children. Heather was one of these students and consequently knew how to operate Eliza. So her job was to be the computer operator, and she was

completely in charge of Eliza's daily operation as well as training the new operator at the end of the month when we all got new jobs. Each child was to work with Eliza everyday for varying lengths of time depending on the assigned program for that day. The schedule for their time was posted in the computer area. A file box with a folder for each child was also in the computer area, where they were to put each worksheet that went with the program to be done each day. This was our retrieval system. It enabled me and the students to see what programs they had done, which ones they needed more work in, and helped them to choose which programs they might want to do during their free time.

Now comes another of those delightful circumstances!! Channel 13, the Arkansas Educational Television Network, which we have watched to a great extent (including "Trade Offs") was carrying a six weeks series, "Adventures of the Mind", on personal computers featuring a TRS 80 Level II just like Eliza. This series was a tremendous tool in helping the children become computer literate, as well as acquainting them with computer related careers and seeing the important and varied roles computers are playing in today's world.

By the time the second semester began, Eliza was thoroughly entrenched in our classroom and we were ready for Economics.

The Test of Elementary Economics from the Joint Council on Economic Educatior was given as a Pre and Post Test in an effort to measure growth in economic understanding. Teacher made tests, other evaluations, and the culminating activity - Testing your E.Q. , were also used to measure their understanding. Results of these tests are reported in the section on evaluation.

We spent forty-five minutes each day for eighteen weeks in our study.

CLASS DESCRIPTION

I was fortunate to have a small class of twenty-one students which enabled them to have more "hands-on" experience with Eliza than would have been possible with a larger group.

The class was a delightful group. All of the students were average or above in ability with two exceptions. These students spent part of each day in our Resource Room for help with their learning disability problems. They used Eliza with as much ease and capability as the other students. I also had three students with IQ's over 125 and a few others who were exceptional students due to their hard work and effort. Eliza helped everyone.

We were in a self-contained class room. Most of the parents had some college education and several of them were professional people. For instance, Tara's father is a computer programmer. They were all very interested in our computer and our project. At our open house at the beginning of school, several parents "visited" with Eliza.

OBJECTIVES

ECONOMIC OBJECTIVES:

1. To develop through our study of the computer's impact on society, the following basic concepts:

   a. The computers effect on the supply and demand of goods and services as they pertain to our wants and needs. (Scarcity)

   b. The contribution to our economic growth and standard of living through computer use, as well as the risk to justice and freedom. (Economic Goals)

   c. Computer hardware and software as capital goods and equipment. (Productive Resources)

   d. People expressing with their dollar vote their desire for computers and the services they render. (Market Economy)

   e. The dependency and uses of computers by institutions. (Financial and Economic Institutions)

   f. Jobs created and eliminated by computers. (Circular Flow)

   g. The increase of productivity through computers and man's growing dependency upon computers due to automation, specialization and technology. (Resource Extenders)

   h. The refinement and increased availability of computers due to involvement of others (Interdependence and Trade)

   i. The process by which the decision is made by business that leads to computer use. (Economic Analysis)

2. To write a software program that could be used as a tool to inform learners of any age about basic economic concepts and evaluate their knowledge of such concepts.

3. To develop a flexible format that could be used as a mini course on economics for future students.

CURRICULUM OBJECTIVES:

1. To exhibit a degree of computer literacy that will enable them to function with greater ease in a society in which the role of computers is steadily growing.

2. To have hands-on experience in working with a computer in as many areas of the curriculum as possible.

3. To have a limited experience with computer language enabling them to write a simple program for our computer.

4. To explore various career opportunities in the computer field.

ECONOMICS OVERVIEW

One of the joys of teaching Economics is the opportunity for student participation and discussion and the freedom to listen to and exchange all kinds of fascinating ideas. The children never seem to get enough of this kind of activity. Basically, that's what we did with our study. While I planned to introduce the nine Basic Concepts of Economics and tie them in with computers as much as possible, I knew that some concepts would be explored in greater depth than others. Some of the activities would not fit under just one concept, but in several, and that we would be using them throughout the study. I will refer to these as "overall" activities and explain them in this section and they will be referred to at various times throughout other parts of the project.

I have found that the children identify with and enjoy using Economic Analysis a great deal, and it was dealt with on the first Trade Offs show we saw. We used Economic Analysis to solve a problem in our classroom.

I listed the five steps on the board and we applied them to our situation. State Your Problem: We decided our problem was that we needed class representatives to handle any chores that might arise in doing our study. We knew we would be having visitors to our room in various capacities and we would need someone to greet these visitors in front of the school and escort them to our room. We decided that we needed an alternate for this same job. We also needed someone to handle any written correspondence that might be needed in our study. We knew "thank you" notes would need to be written and that there were written materials that needed to be ordered for the class. List the Alternatives: We accomplished this by listing a variety of alternatives. Class officers could be elected.

Representatives could be appointed by the teacher. They could be elected or appointed for the full year or for one week only.

State Your Criteria: In this step we agreed on a set of criteria, such as the class representatives must meet the approval of both teacher and students. The representatives needed to hold office long enough to learn how to do the job well, and so on. Evaluate Your Alternatives: The alternatives were evaluated in terms of our stated criteria.

Make a Decision: The decision was made to elect class officers and to let them serve for the duration of the school year.

This brief exercise in Economic Analysis had acquainted the students with the process.

I am fortunate to have a good friend with a doctorate in Economics. She is Mrs. Lorna Pryor, an instructor at our local community college, who is also fantastic with children. She visits my class each year when we study Economics. I try to have her visit us as early as possible because the children quickly start asking what Economics is when they hear that we are going to study it. She has a way of putting things that will cause the children to understand and remember. They loved (and quoted frequently) her definition of Economics: "each of us using resources to accomplish amazing things."

Mrs. Pryor became so "enchanted" with us that she visited twice. She came in October and introduced us to the idea that we are all Economists. She took them through several illustrations of how they are economists by pointing out the jobs they do around the house and the choices they have to make, not only about how they spend the money they earn from these jobs but also their time. As she developed the delightful definition of Economics: "each of us using resources to accomplish amazing things",

she pulled these thoughts from the children themselves. In order to better understand what resources could mean in addition to the earth's natural resources, she helped them to see that "our ability to work hard, our health, our time, our good ideas," are some of our resources. The "amazing things" we wish to accomplish would be the objectives we set for ourselves - the things we want out of life. She elicited some of these wants from the children which included horses, dogs, bikes, and (not surprisingly) computers. She pointed out to them that as they go through life these objectives, or wants, will be replaced by others and there will be unlimited things they want but that these wants will have to be filled with a limited amount of resources.

She then told them the story of Levi Strauss and how the jeans, that most of the children had on, came to be. The children were fascinated with the idea that the popular jean idea came about because Mr. Strauss followed the gold rush prospectors to California in order to sell them goods. His "good idea" to make trousers from a long wearing fabric, normally used to make tents and covered wagons, and sell them to the miners, led to the jeans of today that are called by his first name Levi. Jeff had on jeans called "Wranglers" and after he mentioned this, she led them into a discussion of competition and advertising. She told them that the addition of the copper braids on the pockets was the idea of "Alkali Ike", another man with a "good idea", because the pockets would not tear loose from the jeans when the miners put their tools in them. She helped the children see that first there was a need, and then men had ideas to meet these needs. Her discussion concluded with examples of goods to fill needs and finally services that also are provided to fill our needs. After she left we had a discussion of our own about being practicing economists at school. Mrs. Pryor returned in May to see

some of the things we had done and to talk to the children about the economics of peanut butter. Due to the drought and the rise in price of peanut butter, as well as the scarcity of the item for a while, the children were very interested as she used the Peanut Growers of North America and the Peanut Growers of South America as two imaginary companies in competition with each other for the peanut butter market. She explained how a tariff could benefit one group while penalizing another.

Darren asked, "What would happen if the Peanut Butter of one group tasted better than another, even though it was more expensive?" She then spent some time with them on the effect of the quality of a product and the people's willingness to buy. (This was later to be mentioned again as we developed the Market Economy concept and people's dollar vote.) The children became "hung up" on the quality of a product as we talked with other speakers. Our introduction to Economics was handled quite nicely by Mrs. Pryor and the children quoted her frequently throughout the year.

Another overall activity used continuously, was our scrapbook. In order to improve reading skills, I encourage my classes to read newspapers and magazines. One way I did this was to give extra credit for articles brought in on various subjects. Since computers and their use are constantly in the news today it was not difficult for them to find articles, and they eagerly shared them with the class before giving them to the scrapbook committee to place in our computer scrapbook. A log was kept for the children to sign everytime they used the scrapbook. One purpose of our study was to see how computers were becoming a part of all areas of their lives. These articles, as much as anything, helped them to see the impact computers were beginning to have and would have in the future.

In order to help the students build a strong and meaningful Economic vocabulary, we developed together a glossary of economic words and phrases. I wanted the definitions to be in their words as much as possible as I felt they would be more easily remembered. We wrote the definitions to Economic words that we felt were important to us from notes we had made and kept in our notebooks following class discussions, viewing filmstrips, listening to guest speakers, taking field trips, watching Trade-Offs, and other experiences that we shared as a class. Each child was given a copy of the glossary with instructions to study these words and their meaning. Each day, in order to reinforce and test their knowledge of these words, we played a game with the vocabulary cards we had developed. I laminated envelopes and index cards. A committee took the cards and envelopes and wrote the word or phrase on the outside of the envelope with a marker, and then they wrote the matching definition on an index card that was then placed inside the envelope. Also included in each envelope was a bonus card that entitled the student to various prizes if they could either give the correct definition to the word on the envelope or give the word if I gave them the definition. This was a favorite activity and was used as a learning center in addition to a class activity. The bonus cards were changed daily by a committee.

I kept an Economics Concepts Bulletin Board up throughout our study. As a concept was introduced and developed, we summarized its meaning to us by means of a cartoon strip that was developed by a committee. Characters from the Peanuts cartoon strip were used, and we tried to tie in computers where possible. I will explain and illustrate the concept that was portrayed on the Bulletin Board at the end of the description of each concept.

A research center was set up in a corner of the room so that materials in limited quantity could be enjoyed by all the class. They were urged to go to the corner during spare time and to share with the class any information they had gained from these materials.

SCARCITY

(A Computer Supplies Some of our Wants and Needs)

Scarcity is one of the easiest of the nine concepts to develop. Mrs. Pryor's visit had helped the children to see and easily understand that their wants exceed the resources they have to get those wants, so therefore we have the problem of scarcity. We watched a filmstrip entitled "We Are All Consumers" in which we learned more about making choices.

It also helped us to develop the idea of the differences in wants and needs. As we discussed and listed various wants suggested by the children it was easy to lead them to see which of our wants we must have to survive. So we decided that these wants should be listed as needs. They were able to pick from our list - food, clothing and a place to live as things we require.

From viewing Trade-Offs we were further able to understand scarcity and the problem of limited resources. At this point I felt it was a good time to develop the theory of Supply and Demand in relation to computers. With the theory being that with a limited supply of an item the price will be high, and at this high price there will tend to be less demand for a product, we looked into the history of computers. Mr. J.R. Collins, an instructor in Data Processing at our local community college, came to visit our class. While he covered many topics with us, I intend to focus on the history of computers and how we developed our Supply and Demand Bulletin Board during this part of my project.

Mr. Collins introduced the class to the terms Data Processing by discussing how the U.S. Census information was processed in 1890. Even that long ago people punched holes in cards to form patterns that represented

numbers and letters. This is the same technique used today with key punch operators and equipment, but much more refined. He then traced machines used to calculate and process data through the years. About thirty years ago computers began to be used in businesses. They were very expensive and the machines were quite large and there were not many companies producing them. As businesses found the need for processing more and more information the demand for computers increased. More companies got involved in the production of computers to where there are hundreds of companies now producing computers. Mr. Collins pointed out how computers help solve a scarcity problem for businesses as there would not be enough time or people available to process all the information some businesses require such as telephone companies, government agencies, airlines, etc. Thus were we able to relate computers and scarcity. About this time Darren brought in an article (see scrapbook) entitled "Computer Prices Rise". That helped us devise our bulletin board. The article explained that over the years the prices of computers have decreased, unlike the cost of most goods and services. This is due in part to the rapid advancement in computer technology. Recently though, the price of computers, too, began to increase. Another article was brought in by Teresa entitled "Your Computer - Practical Soon". (see scrapbook) While the article pointed out the expense of computers, several examples were used to illustrate their worth to the ordinary person. From all this information and from research using the pamphlets "Economics for the 80's" and "The American Economic System and Your Part in It" we developed the following bulletin board: A seesaw was used with a "humanized" computer on one end and an enlarged dollar sign on the other. For the time period representing the 1960's when the supply of computers was low, the seesaw end with the computer on it was lowered and the seesaw end with the dollar

sign was raised high to indicate that with a limited supply the price was high. As we moved into the 1970's with more of a supply available, the price and supply leveled off some with the seesaw being only slightly out of balance with the prices still high and the supply coming up a little. As we entered the 1980's with the rapid advancement of technology and Microcomputers and competition of various computer companies, the supply of computers became larger. The seesaw reflected this by lowering the end with the dollar sign (price) and raising the end with the computer (supply). We used Darren's article to discuss the fact that now that the demand for computers seems to be increasing, the prices will also begin increasing in the years ahead. I tried to stress to the children that situations vary when dealing with supply and demand theories. We concluded with the thought that usually the higher the price of something the more of it that will be produced by business. When production reaches or exceeds demand there is a tendency for prices to level off or to be reduced. Through competition better technology is used that can also result in decreased prices. As prices become lower the demand by the people should increase.

The committee working on the cartoon strips for the Basic Economic Concepts Bulletin Board developed a cartoon showing Snoopy and Woodstock looking at displays of items that dogs and birds might "want" to purchase and saying "Our wants are greater than our resources."

ECONOMIC GOALS

(The Computer's Contribution to Raising the Standard of Living vs. Infringement on Individual Freedoms)

In order to "pave the way" for our first activity involving Eliza and Economics, I decided to explore with the class the Economic Goals of our society which include Justice, Growth, Stability, Security, and Freedom.

Our discussion began by deciding that a standard of living is the way we are able to live and the things we are able to enjoy as a result of living in a certain country or under different Economic systems.

Since Iran was so much in the news at this time and because their system differed so from our Economic Goals, I felt this was a good country to use. The goals were listed on the board and the children were asked to keep a notebook. They were to take notes that would later help to develop definitions for an economic vocabulary as well as an understanding of the nine Economic Concepts that I wanted to introduce to them. Christy had an older sister who was married to an Iranian student, and her sister had visited Iran just before the chaos in the country became really bad. Christy informed us that they did not have indoor plumbing in most of the homes there. Our discussion led us to compare other problems they have such as a limited food supply, the lack of freedom and justice for all the people due to the Ayatollah Khomeini's dominance. The children were quick to grasp the idea that the fighting going on between the different groups there would have a big effect on the stability of the country and the lives of the people. Darren pointed out that it would be hard for a country to show any growth and development when most of the country's efforts were being spent destructively by destroying the refineries and

other industries. He also mentioned that they were more united in demonstrating over the hostages than rebuilding their country and improving their way of life.

After our discussion of Iran, other underdeveloped countries were mentioned including Africa, Cuba, and Vietnam. It was agreed that their lack of technology hindered their development as much as anything.

We decided to see how our country went about meeting these Economic Goals. (Whenever possible I tried to get them to see any effect a computer might have on whatever topic we were discussing.)

As we discussed Economic Growth, I asked Teresa to think of how people counted and kept totals, etc. in very early times. She thought that perhaps they used their fingers and toes to count with. Jill mentioned they used symbols scratched on their cave walls. This led to a discussion of various counting devices and how they improved through the years to the point that we now have adding machines, calculators and computers. We considered how these devices have helped our country grow in such areas as space exploration and how these discoveries used for exploring space are now used in other areas such as medicine. (We had a story on Robert Goddard and his work with rockets and computers in early space development in our reading text, Medley by Houghton-Mifflin Company)

As we explored the area of Stability, most of the children were aware of and agreed that we are having some problems in this area now with the changing interest rate, and inflation (the meaning of this had been discussed and developed in our Vocabulary cards) being such a problem for their families. We did still feel that it is such an important goal and one that we have had trouble with in the past history of our country.

One possible answer for this problem would be to increase our productivity which I told them we would explore further as we discovered areas in which computers could do this.

In the area of Security, we explored the idea that we have basic things that we need to survive and that these things include food, homes, and clothing. We felt that Security for us is seeing that these needs are provided. While the children knew that these needs are usually provided with salaries earned from jobs, we then discussed what happens to the fulfilling of these needs when jobs are hard to find. Most of them were surprised to learn that a part of the taxes we all pay provide this service for people who cannot find work at times. Sydney asked what would happen if you did not have a father to work and bring home money for your family. Chris' father is an insurance salesman, and Chris told us a little about insurance policies that people can buy to provide money for this purpose if a parent gets sick or should die.

When Justice was written on the board, Heather raised her hand and volunteered that "that meant being fair to each other." Kate, whose father was a lawyer, told us it was "What we had lawyers, juries, and judges for." We then discussed the ways courts help us. Several children mentioned the fact that criminals have to go to courts and then to jail. Brett was quick to point out that not everyone who goes to court is a criminal as he proceeded to tell us about his father going before a judge because he thought someone was accusing him unfairly and the judge was able to settle the matter for him.

I had purposely saved Freedom for last as I wanted this to set the scene for our school wide mock presidential election, by stressing the freedom we have to vote for elected officials. As I put the word on the board, hands started waving, seemingly with one common thought - "freedom

to do what you want." We discussed this suggestion so that we further realized we have this sort of freedom until it interfers with other people's rights and freedom. I then suggested to them that one of the most basic freedoms we have is the right to vote and what we can do when we are not happy with what the people we elected are doing. This led to the announcement of our Mock Election. They were very excited about this and became even more so when they found out that Eliza would play a very important role in our Election. I explained what a mock election was and we began to make plans for ours. I had written and tested the software program to be used on Eliza. We wrote an announcement of the election inviting all fourth, fifth, and sixth graders to vote and distributed them to each class. My class was quite familiar with operating Eliza, but we decided we would need someone to standby in case a voter needed help in operating our "Voting Machine". Brett was quick to point out that this sometimes happened at a real voting booth.

We elected students to fill in at various capacities in our election. We had the students register with their teacher by a deadline if they wished to vote. A sample ballot was sent home the week-end preceding the election. We were fortunate that 1980 was a National Presidential Election year because of the interest it generated.

Election day was exciting. We had chairs for our voters to sit in while waiting to cast their vote. We had a registration table where they were to give their name and room number which was checked with the registration sheet given us by each teacher. They then signed a sheet of paper so that signatures could be checked. Most of the students had gone with their parents to vote at some time so we were able to set up a fairly accurate procedure for voting. We opened the polls at 9:00 a.m. and it took all day to run our voters through. The last ballot was cast at 2:35

p.m. That it took so long for all 121 people to vote came as a surprise to us. This was partially due to the fact that a sample ballot was included in the program so that they could practice voting by way of the machine before they actually cast a vote that the machine would count. The experience was every bit as exciting and impressive as we thought it would be. Within two seconds after the last ballot was cast we had our results!!! The speed with which Eliza was able to do this was the most important example of the capabilities computers have for effecting our society.

Our results followed the trend that was to be set the next day in the National Election. On the Wednesday following the election while Arkansas was still listed as "Too close to call in the Presidential contest" and the country still did not know who our new Governor was going to be, we felt like we had maybe a hint of how things were going to turn out by looking at our results. In our local state senator election, which turned out to be very close, we had also followed the trend. In all cases our winners were the same as the local, state, and national winners.

We had 132 eligible voters and 121 voted for a 92% voter participation. The children expressed genuine surprise that some would choose not to vote until Brett (always our thinker) pointed out that they have the freedom to choose <u>not</u> to vote as well. Tara's curiousity was aroused by this time and she asked about the percentage of eligible voters that actually vote in a real Presidential election. We decided to research this at our local library and learned that in the last Presidential election in 1976 only 56.5% (World Almanac) of the eligible voters actually voted. We decided to watch for the percentage in this election and later found that only 52.4% (American Magazine) voted in 1980. This startling bit of information made those who questioned the fact that some of our students chose not to vote feel a lot better about the amount of participation we actually had.

We were made aware of a potential danger of computers as complaints came in on Wednesday about the voters in California not going to the polls after hearing the computer predictions and President Carter's concession speech so early in the evening. We watched with interest throughout the year as legislators came up with various solutions to this problem.

We moved into the next phase of developing the concept of Economic Goals when the film "The Kingdom of Mocha" arrived. Since we had already discussed the standard of living of a country, it seemed appropriate to view this film of a very primitive society on a small island and what happened to the people on this island as they underwent economic changes. I asked the children to watch the film with the idea of what computers might be able to do to improve life on the Island of Mocha. At the conclusion of the film (which is as informative as it is entertaining) they were asked to write a paper on how computers could have changed the life of the people on Mocha.

Another opportunity soon arose to further explore Economic Goals with computer involvement when Karen brought in a newspaper article for the scrapbook we were keeping of articles about computers. Karen's article (by Sylvia Porter) was entitled "Instant Banking Has Dangers". The article (see p. 1 of scrapbook) listed advantages and disadvantages of Electronic Fund Transfer systems. Under the disadvantages was the concern for invasion of privacy with the distinct possibility of someone having access to your personal I.D. number and thus personal information concerning you. Another disadvantage the children were interested in was the inability of a person to "talk" with impersonal devices. The children began to look for and bring in other articles that stressed problems created by computers including one on "Computer Crime - The Modern Way to Steal" (see p. 15 of scrapbook) As we concentrated on this area and

its impact on personal freedom, the TV show we were watching about personal computers, "Adventures of the Mind", presented a show entitled "For Better or Worse: Advantages and Disadvantages of Personal Computers." I asked the class to watch this show and be prepared to debate the subject "Are computers helping or hurting our society?" The program pointed out the advantages and disadvantages very well, from watching it and collecting articles we were able to have a very lively debate and come up with the following advantages and disadvantages.

Advantages:

1. Large amounts of information are quickly and easily made available.
2. Boring and time-consuming work done by people can now be done by computers.
3. Decisions based on many different bits of information can be made by a computer.
4. New jobs would be created.
5. Money could be saved as the time required to do paper work is cut and computer controlled devices can be a big saver in the area of energy consumption.
6. Communication improvement as information is passed electronically by way of phone lines.
7. Quick and accurate results can be obtained as in the area of rocket and space exploration.
8. Increase in a worker's output.

Disadvantages:

1. Increased danger of the misuse of personal information.
2. The elimination of jobs.
3. A larger capital investment needed to buy and maintain the equipment.
4. The many different machines and different languages needed to operate them.
5. Extra training will be required for employees.
6. Difficulty in going back to manual ways of doing things in case of a power failure or back up equipment failure.

7. The need for back up systems in case of destruction or loss of information.

8. The chance of error in machine operation. Computers do what you tell them to, not necessarily the same thing as what you want them to.

9. One error made will often lead to many others as the computer processes information.

10. The speed with which computers work can create a real danger when they pass along incorrect information (someone's credit rating for instance.)

We concluded the study of advantages and disadvantages when two more articles were brought in for our scrapbook. One was on the delay in launching the shuttle due to a timing error between two computers (see p. 24 of scrapbook) and the other was about a computer alert being responsible for keeping an airplane from crashing into an antennae on top of a tall building, (see p. 24 of scrapbook).

I felt that we had met my objective under Economic Goals as we explored the contributions computers make in improving the standard of living while also pointing out some of the risks involved to one's freedom and justice.

The committee working on the Concepts Bulletin Board depicted Economic Goals by several Peanut characters saying "Our Economic Society promotes Justice, Security, Growth, Stability and Freedom."

PRODUCTIVE RESOURCES

(A Computer As A Capital Good)

In order to develop the idea of productive resources, I asked the children to think of everything required to manufacture a computer. Many of the activities we had been involved with up to this point (Mr. Collin's and Mrs. Pryor's visits, the filmstrips "Where We Get Our Goods and Services," "Private Capital," and "Profit Motive") helped us to make a list of various things needed in order for us (as consumers) to have computers. Kate, who constantly quoted from Mrs. Pryor's visit, said, "First, you have to have the 'good idea'." All of the children quickly agreed with this and then other suggestions began to fill up our chalk board:

"A place to build them!"

"Stuff to make them from."

"People to make them."

"Machines to help make them easier."

"Assembly lines."

"Money to buy the stuff to make them."

"The silica needed to make the chips."

After a few more suggestions, I then wrote the following headings on the board: Land (Natural Resources); Labor (Human Resources); Capital Resources, and Entrepreneurs. We talked about each heading and what each one meant. They were already familiar with natural resources and entrepreneurs from units in their social studies book. Capital resources took a little more exploring as I found that they tended to think in terms of money only, but I was able to get them to understand that when money is spent to buy equipment to help run a business it is considered as capital money, but not

the same as capital goods or tools. I pointed out that "Eliza" would be considered a capital resource (a capital good or tool) as I use it in my "business" of "teaching children". Labor (human resources) was an easy idea to get across as we had been very aware of how people are needed to produce goods and services. The children had been quite concerned about people (human resources) being replaced by computers. After I felt that these four areas of Productive Resources were understood we looked again at our list of requirements in order to produce a computer. We were then able to place these under one of the four headings on the board. Our heading and listings looked like this at the end of our discussion:

Land (Natural Resource)	Labor (Human Resource)	Capital Resource	Entrepreneurs
Place to build them	People to make them	Machinery	Risk taker
Stuff to build them	Planners who have good ideas	Tools on the assembly line	Investors with money
Stuff to make them from Silica			

We then talked about how these four things are needed in order to produce any goods and services.

As we prepared for several of our field trips I asked the children to keep our list of productive resources in mind and to watch for examples of them as we toured the different businesses.

Numerous field trips were taken during our study and I tried to connect them where possible with as many of the nine concepts we were developing as possible. My main purpose in visiting as many places as we did was to impress upon the children the various roles computers are having in so many areas of our lives.

We learned that the government is the biggest user of computers. So, after viewing a filmstrip entitled "Government Goods & Services", a field trip was taken to our city government offices. Mrs. Sheila Dyer spent a morning with us showing how the city uses computers. We learned that they

only recently acquired computer service and do not at this time have their own computer. They do, however, use a "time sharing" system through a local firm called Data Tronics. This system involves sending information by way of a computer terminal through telephone lines to the Data Tronics office where the information is compiled into the form needed by the customer (in this case the city offices). Time after time throughout our study we were told, by various speakers, both in the classroom and on our trips, of how many people and hours it would take to process and collect in traditional fashion the information needed by the various businesses we visited. Mrs. Dyer explained the use of the security system used so that information would be protected and reliable. She also told the children how computers are able to help the city government predict tax money that the city will receive for operational purposes. The children had learned of this computer capability from the ETV show "Adventures of the Mind.") I was pleased that in almost every place we visited the children were given a chance to use the computer itself. Many times we were given mementos of our trip, usually something produced by the computer. Some places we were even able to "feed" the computer a name or parent's name of one of our class members and have the computer give back information about the person. We visited the Fort Smith Public School Administrative Office where, much to their delight, they were able to learn my age when my name was fed into the computer and information concerning me was returned. Here we learned that their computer was able to "do more tasks of a different nature more efficiently." We were told that at this time each high school and each junior high school has its own terminal that feeds into the computer which is located at the administrative office. Scheduling of classes for students in junior and senior high schools is handled by way of computers.

Right now the school computer is used mostly for business purposes. It makes the payroll, pays bills, keeps accounting records, and processes student and staff information and inventories. We were told that it is hoped to eventually have terminals in all schools in our system.

Another field trip taken was to the local newspaper facility. Mrs. Hilda Stroud gave us a very interesting tour and stressed that they were "heavily involved with computers." We saw evidences of this in most areas we visited. In the advertising department, where we learned that that is how a newspaper makes its profit, there were many terminals visible and we observed how they were used. In the copy room it was pointed out, that they no longer have the print type machines which some of the children remembered from earlier trips. Now all of the copy is set by typing designed to be printed into a computer terminal. Mrs. Stroud answered the inevitable question about people losing their jobs due to computers by replying, "Computers don't replace jobs, they change jobs." The children were fascinated by the three story tall electronic printing press. Each child was given a newspaper which was later used to find ads related to computers.

No where was it more apparent the important role a computer plays in a business than at the telephone company. We saw telephone operators actually completing phone calls for customers. It was apparent to the children that the telephone operators' switchboards were computerized. They enjoyed comparing them to the various computers we had seen. The operators explained the various functions of the keyboards and what the responses displayed on the screens meant. We were then taken to the "heart" of the system where we saw the computer and its complicated maze of wires and parts. We knew that the speed with which a computer accomplishes things was one of its greatest talents and they remembered well how quickly

we received our election results. But, here in this huge room looking at this terrific machine, and seeing and hearing (incessant clickings as calls were completed) the speed in which calls were completed was perhaps one of the most effective lessons in computer capability. Our guide pointed out that we could not have a communication system as we know it today without computers.

After these field trips, during our discussions of what we had seen and learned, I always returned to the idea of examples of productive resources we had seen. I now felt that the students understood our economic system's use of productive resources. Brett was quick to point out that while it was easy to recognize three of the factors of production on our trips i.e., labor, land and capital resources, we did not always get to see the Entrepreneurs on our field trips as with our trip to the Southwestern Bell Telephone Company offices. Teresa was ready to argue with him, and made a point of mentioning that some of the people who work there might also own stock in the company and so they could be considered Entrepreneurs as they took the "risk" of investing their money in that company. That the children were understanding capital investments and the role people and money play in developing businesses that produce goods and services was becoming more evident with each activity.

Our Concepts Bulletin Board Committee developed a cartoon strip that depicted Productive Resources by showing the Peanuts Characters' Lemonade stand. With the land the stand was on, the lemons, water, and sugar representing Natural Resources; the stand itself, the lemon squeezer cups and lemonade pitcher representing capital equipment; the people selling and making the lemonade representing the labor or Human Resources; and one of the characters with fists full of money representing Entrepreneurs.

MARKET ECONOMY

(A Market For Computers Is Created By The Dollar Vote Of The People)

After taking so many field trips and seeing how much in demand computers were, it seemed a good time to introduce the children to a more indepth look at the concept of our market economy. I referred the children back to our Supply & Demand Bulletin Board, and I began our discussion by asking them to tell me what they thought was the main reason more computers were being produced today than in the 1960's. I received various responses to this question:

"They are cheaper to buy now than at first."

"There are more computers to choose from."

"They are so much fun."

"They do so much work so fast."

"People know about them and want them."

(I felt all these answers were good ones and reflected how much was being absorbed through our trips, speakers, etc.) We really got into the "meat" of the concept as I then asked them why? We took several of the reasons given and discussed them. Brett remembered that Mr. Collins had told us that there are hundreds of companies now producing computers. I introduced them to the idea of competition. We explored together the idea that businesses want to make a profit and, after viewing the filmstrip "Profit Motive," they were able to see that if there is a product that consumers want, like computers, producers will try to use the resources it has to make that product. The product will have to be placed on the market at a price the consumer will pay and still allow the producer to make a profit. We talked about what would happen to the price of computers if only one company made them. Kate said, "Well, for one thing we probably

wouldn't have one in our classroom!" I heartily agreed with her, and the children realized that in this situation the producer could charge any amount for their product they desired without the competition of other companies. I introduced the word monoply in connection with this idea. Darren asked, "What is an oligopoly?" He had remembered this word from one of our film strips. I told him that it was a monopoly of sorts as it was a situation where two or three companies control the marketing of a product. (Oligopoly became a favorite word, along with entrepreneur.) He felt that this might have been the situation in the early days of computers. Teresa remembered an article brought in earlier for our scrapbook about prices of computers dropping because of the rapid advancement of technology in the computer area. When I asked the class how they first heard about computers, most of them replied that they had first heard of them on television. This led us into a discussion of advertising, and we also viewed some filmstrips on advertising. I then asked the children what people (or consumers) will do after they hear about a product, and decide that they are willing to spend their money on that product. "Buy it!" They responded. I then pointed out to them that buying a certain product is like casting your vote for that product, and that every time a consumer buys a product he is voting for that product to stay on the market. We then mentioned some things that are no longer on the market in large quantities, as they were voted out when people no longer were willing to buy them, such as hula hoops.

We concluded the development of this concept of free enterprise, a term that I wanted the students to understand was interchangable with market economy, by having them list in their notebook - What to Produce, How to Produce, and For Whom to Produce.

Under each of these headings we listed these thoughts:

What to Produce	How to Produce	For Whom to Produce
1) The consumer decides what will be produced by his dollar vote.	1) Due to competition, the producer decides how best to produce a quality product.	1) Families, businesses, and even the government decide for whom to produce by their incomes and their willingness to buy.
2) Private enterprise believes strongly in consumer satisfaction.	2) The profit motive influences the producers methods of making a product.	2) The price charged by the producer helps determine who will buy it.
3) Quality as well as price is important in winning our dollar vote.		

It was obvious after our many field trips that businesses and people were casting their dollar vote on the market for computers and their services they perform. To reinforce this idea further, we looked in the phone book and in our local newspaper and found that there were many local Data Processing companies in competition for these dollar votes.

Our Bulletin Board Concepts Committee created a cartoon strip that illustrated "What to Produce" by showing a Peanut's character trying to decide whether to cast his dollar vote for a large car or a small car. "For whom to Produce" was illustrated by a salesman trying to sell his car to a consumer. "How to Produce" was illustrated by showing the assembly line production of a car.

FINANCIAL INSTITUTIONS

(The Use of Computers in Financial Settings)

In order for the children to appreciate and understand the role of Financial Instutions in our Economic System, I explored the ideas of barter and trade with them. We had already seen "The Kingdom of Mocha" and how this primitive society used trading at first, and then clam shells and later developed a banking system. The March 14 issue of our Weekly Reader had an article entitled "Many People in the U.S. Are Trading." They liked the idea of trading goods and some individual trading went on throughout the year. (Several bonus cards won by playing our Vocabulary Game, changed hands several times before being turned in to me.)

We then watched a filmstrip called"Banks & Banking" that explained the function and services provided by a banking institution. We followed the viewing of this filmstrip by a trip to a savings and loan company. I chose First Federal of Fort Smith as they also provide a tour of their computer facilities as well as the other parts of the company. I felt that the children were more unfamiliar with this type of institution. Mr. Rainwater, the Vice President of marketing talked to us and took us on a tour of the building. The children learned a great deal on this trip. They found that there are many similarities now between banks and savings and loan companies - more than there used to be as savings and loan companies may now provide their customers with checking type accounts. They are governed by a different Federal system than banks. After Mr. Rainwater explained the sources from which they get the money to loan people and how First Federal earns money and that primarily they loan money for building homes, he took us to see the computer. There we

learned that they bought their own computer system last May, when the firm in Tulsa they had been using could no longer handle all of First Federal business. We learned about "time sharing" as he explained about telephone lines transmitting the information to the computer in Tulsa where all the information was then processed into the proper form and sent back to First Federal. Josh asked, what turned out to be a standard question on each of our field trips, if anyone lost their job as a result of acquiring the computer. Mr. Rainwater told us that the person who had been head of the savings department was put in charge of the computer and that a fulltime programmer was hired. He told us that computers usually create jobs, which often requires further training,but seldom do they eliminate jobs for current employees. After hearing about all the kinds of information that computers keep up with and the speed with which the computer is expected to do it (every night the computer calculates the interest on each account) The children were able to see how important computers are to our financial institutions.

We had explored the similarities between banks and savings and loan companies. I wanted the children to learn a little about the stock market, so I invited a speaker from the local office of A.G. Edwards to visit us and explain a little about reading the stock market report and to tell us how a computer aids them in providing services for their customers. Mr. Pettus Kincannon came and gave us a lesson in reading the local paper's listing of the stock market report. He also explained how computers were used in compiling the information needed by sotck brokers. We watched the data processing firms (see p. 22 of scrapbook) for several days as the children brought in the stock market column to include in our scrapbook. We noticed in one of the columns (see p. 16 of scrapbook) that computers were being used in selecting stocks for the week based on

outstanding basic value and above average market interest.

We learned from Mr. Kincannon's visit how some companies are formed by people buying stock in the company and becoming a stock holder or "part owner" of the company. Teresa brought a stock market certificate she had received for her birthday to show us.

I had purchased a book of computer programs that included a game called "Stock Market" that simulates trading on the stock market. Some of the children recorded the game on tape for us and the class members were able to "play" the stock market by loading this program into Eliza.

We found that we had a better understanding of the financial institutions of our Economic System after this portion of our study.

We became aware of the important role computers are playing in areas of banking today as more and more articles were being brought in about banks involvement with computers (see p. 1,3,16,18,22 of scrapbook) and even articles explaining how banking procedures will be transacted at home where such homes have computer services such as Eliza.

The committee working on our concepts Bulletin Board created a cartoon strip for Economic Institutions, showing a Peanuts character using one of the computerized tellers providing twenty-four hour banking service to the customer. Another character was visiting a savings and loan institution and another character was reading the information being fed from an electronic machine about the daily stock market transactions.

CIRCULAR FLOW

(Computer Related Careers As An Important Part Of The Circular Flow)

The children had some idea of how the circular flow of money worked due to the play money they received for the jobs held in the room and the opportunity they had to buy items with this money at our monthly auction. This provided me with the money to pay them for their jobs again. We also watched a filmstrip entitled "How Money Goes Round and Round" which helped us a great deal in understanding this concept.

One of the better filmstrip kits I used was one ordered from the Bessie Moore Economic Education Center at the University of Arkansas. It was a two part kit entitled "Getting and Spending, Economics Part 1" and "Call It Wishing, Economics Part II". This kit was very well done and thoroughly enjoyed by the children. Our discussion following these two filmstrips led to the understanding that if there are more jobs available and more people working at these jobs then there will be more money to spend. We developed a poster from this thought that we called "The Money-Go-Round". It featured a wheel that filled a regular sized poster board and spelled out around the outer edge of the wheel, "The More Jobs There Are - More There Is to Spend" and featured enlarged dollar signs scattered randomly around the wheel to represent the fact that more money would be available to spend. The wheel was divided on the inside into ten sections or "spokes". These sections were filled in with computer careers that we had learned about from our resource speaker, Mr. Collins' visit. He told us about career opportunities, along with the history of computers. We left one section with a question mark to represent the idea that the future in the computer area holds the potential for jobs unknown

at this point. The wheel was movable so that it could be easily read.

Our entire school, as were several schools in our system, was participating in a Diffusion Network Program called CAP for Career Awareness Program. Our faculty had received training as well as excellent materials in kit form on various careers that could be developed through all areas of our curriculum. In visiting with the CAP representative on one of her many visits to our school to see how we were doing with the CAP program, I mentioned my Economic's project to her. Along comes another of those delightful circumstances! The CAP staff had just finished developing a unit for their kits on computer careers. While it was written for and intended to be used on the junior high level, I felt my children could handle the unit because of their computer background. She offered to send me a set of materials for my class. The CAP program works under the premise that you teach the children about various careers, including training and skills needed, job descriptions, etc. as an intergrated part of other subjects. In this case I would be teaching the children a math lesson about base two and, in turn, they would acquire the information about the skills, etc. associated with being a computer programmer. Since computers work on a binary system this was all very logical and is typical of how the various other careers were worked in during our basic curriculum studies. The children loved working with base two and we even got adventurous enough to try other bases. In addition, they were able to more closely identify with the career of computer programmer. (I had selected four children to receive computer programming instruction in preparation for our culminating activity. This idea will be more fully explained under the culminating activity section.) I was glad to see CAP take this technique of teaching career awareness through other subjects as this is how I like to develop Economics - through math, social studies, or as many

other areas of the curriculum as possible.

Mr. Collins had prepared us well in looking at careers available in the computer field. We also had some books at our Reference Center on computer careers. Three of the students chose books from there to do book reports for English. The books were: What Can She Be? A Computer Scientist, Careers in Computers and Computers. Darren even used Eliza to do his book report using a question and answer format and recording it on Eliza for the class to see.

The newspapers each child received on our field trip to the local newspaper were used to search for want ads related to the computer field. These were collected and glued on poster board and posted in the room to emphasize the opportunities available in this area. The children were now aware of different careers in the computer field and Mr. Collins had made a point of stressing how many jobs were available in this area. He pointed out the fact that it is a relatively new field and does not take a great deal of experience to get a job that receives a good salary. With this backgound I felt it was time to further explore the circular flow of money.

We did this by developing a flannel board with movable parts. I've found charts are more meaningful to children when they contain manipulative parts. We had a building to represent businesses, a house to represent households, and a person to represent workers. Then there were arrows entitled Labor, Land, Capital and Management; Rent, Wages, Interest, and Profit; Income spent on Goods & Services; and Goods & Services. The arrows showed a pattern of workers selling their goods and services to businesses for salaries that they in turn use to buy goods and services from businesses. As we discussed income and how it is paid and derived the children were able to see the four Basic Factors of Production that we had learned about under Productive Resources. For land, rent is paid,

for labor we have wages or salaries paid, for capital we have interest and for entrepreneurship (or management as we called it on our Flannel Board) we had profit. An important point made with the children was that the income we take home goes to pay for (1) the basic needs of our family (food, clothing, shelter); (2) taxes to the various governments to provide some of our collective needs and wants; (3) insurance, recreation and wants we have; (4) and most families put some money into savings where they are then able to receive interest (another source of income) and at the same time this money in savings can help provide the capital needed by new businesses. The children worked with the Circular Flow Flannel Board, frequently, and I found it a more successful way to explore this idea than any I had used in the past.

One day during our discussion of careers and what the children would like to do when they were grown, Teresa asked me if I had wanted to be a teacher when I was a little girl. When I told her no, that I had wanted to be a pilot, we got curious about our parents and if they were doing today what they had wanted to do as a child. I had already planned to do a survey with our parents to see how many of them had jobs that involved computers in any way so we proceeded to develop a questionnaire for our parents.

We found from our survey that only five out of the twenty-three responding to our survey are holding jobs today related to what they wanted to do as a child. Most of our parents had held from three to five different jobs up to this time. Fifteen out of the twenty-three would like to be doing similar or the same type of work ten years from now. We found that eleven people directly work with a computer in their work while twelve do not. When asked if the business they work for uses a computer or computer service in some way, the number rose to fifteen who do and dropped to eight

who do not. Twelve felt their jobs were unaffected by computers while eleven felt that their's was affected. When asked ways in which a computer might affect their job, they listed less paper work; easier access to information; more efficient use of time; relieve the monotony; speed; and providing more information for decision making. Calculators, electronic games, TV video games, microwave ovens, telephones, stereos, and television sets, were examples of computers found in the house. Of the eight businesses who do not have computers at all four responded yes to the question of future plans to either buy or lease one in the future.

Because of the children's obsession with computer's costing people their jobs, we decided to role play situations where a member of the family lost a job due to a computer. I divided them into five groups giving them various situations and reminding them of several ways to handle the problem but leaving the solutions up to each group. The groups met and planned their presentation. The next day each group role-played how they would handle the situation. I encouraged them to use different approaches and they did. We all agreed that the group that encouraged Dad to go back to school for training with computers so that his company would rehire him was the best solution. This group had done a good job of showing the sacrifices the whole family would have to make in order for "Dad" to do this by having the children get babysitting and paper route jobs as well as using their savings. One group's solution was for Dad to draw unemployment while looking for another job. One group was just a man and wife and the wife was the one who lost the job. Their decision was for her to not seek further training or employment but to raise a family instead. The children enjoyed this activity and they were able to put to use some of the information gathered from our field trips.

By the time we finished this area the children were aware of job

opportunities and the effects of jobs and savings on the Circular Flow of money.

Our Concept Bulletin Board Committee's cartoon strip showed the Peanuts character, Snoopy applying for a job at a toy store and doing work there. He then takes his salary to buy a football (buying goods) which enables the toy store to pay salaries. He is also hurt playing football and has to pay for medical services, thus illustrating the circular flow of money for goods and services.

RESOURCE EXTENDERS

(The Increase Of Productivity Through The Use Of Computers)

No concept was more clearly developed than this one. What computers were able to do in the area of extending our available resources was evidently clear to the children long before this unit was completed. Every activity we undertook pointed this out. Because of the mere fact that computers were a result of our advanced technology, we were able to see immediately the role technology plays in extending our resources.

The recurring statement we heard time after time on all of our field trips was that it would be impossible to hire enough human resources (people) to do all the work that computers can do.

I had wanted to impress on the children how many areas of their lives were involved with computers in some way. We had seen in our classroom and from our field trip to the public school administrative offices that the area of education was computer involved. Our trips to a savings and loan, the phone company, the newspaper and the city government offices also helped them see other areas associated with computers. Our resource speakers had increased our awareness of computers. Mr. Collins, from the local community college not only told us about computer careers and the history of computers, but how the college itself used computers. Mr. Kincannon spoke of the stock markets dependency on computers. More and more, the far reaching impact of computers on our lives was beginning to take effect.

Our survey with our parents about the use of computers in their jobs led us to the next step in our study. We developed a bulletin board entitled "Technology Effects Economic Development". We drew pictures of all the places we visited on our field trips that used computers. We also drew pictures of the places we learned of from our resource speakers that

used computers. We then drew pictures of the businesses that used computers that we learned about from our survey with our parents. These pictures were put on this bulletin board. A picture of a computer was placed in the center of the board with color-coded strings running from the computer to each place of business. The red strings signified places that we had either visited or had speakers from. The black strings indicated businesses that used computers that we learned about from our survey with our parents. As we learned how computers contribute to the prosperity and success of a business, we were able to see, in turn, how computers (and therefore technology) affect the economic development of our community.

One of the most interesting trips that I have not described yet was our trip to the hospital. I used this trip in developing the concept of technology's role in extending resources. The technology involved in the computer based machines used in the hospital was the most impressive we saw anywhere! We did not even visit the accounting and admitting areas of the hospital, (I felt this area had already been explored enough), which are big computer users, and yet we were still able to see many examples of computer use in the hospital. We visited Radiology and saw by way of computer, a heart pumping blood. We saw live pictures of the brain, liver, lungs and kidneys. The information and diagnosis gained from these pictures was stored on software called discs. (We were "computer literate" enough at this point to understand what we were being told about the computer's role in diagnosing problems.) We were told that the computer can calculate and measure medicine for patients in one second when it would take a person three to five minutes to do this. We learned about the terrific expense of the machines we were seeing - a CAT SCAN machine, for instance costs $600,000 - 700,000. (A capital investment, Darren pointed out.) We were also told, as we had been at the phone company, that computer type machines

become obsolete or outdated very fast due to the rapid advancement made in computer technology - frequently within two years. We enjoyed this visit perhaps best of all. One of the lab technicians let the hospital personnel use a machine on her so that we were able to see her gall bladder, liver, and kidneys. (We were doing a unit on digestion developed at Berkeley, California at the time of our visit, so the children were entranced with this part of our trip.) The pictures that were being taken by the CAT-SCAN machine were of the human brain, in color, and fascinating to see. I know I enjoyed this trip most but I honestly feel that the children did too.

I was now ready for the students to see uses of computers other than storing of information. In order to prepare the way for exploring the use of computers in manufacturing we viewed several film strips that developed the ideas of mass production by way of specialization, automation and assembly lines. They learned of Eli Whitney's contribution to mass production in the manufacturing of muskets using interchangable parts. Will pointed out that computers are cheap enough for us to buy today because they are mass produced. One of our films on automation reinforced the idea that machines do not put people out of work but instead create more jobs than ever as people are then needed to service and fix the machines.

Another of our resource people visited us about this time. Mr. David Cordill, who is with IBM, brought a film on computers for us to see. While much of the film entitled "A Film About Computers" was about the parts and workings of a computer, it got into some uses of computers in manufacturing. The film pointed out that computers are used to direct other machines, as in assembly lines, more efficiently. Through the use of computers in assembly lines we are able to "increase productivity and provide greater variety and choice of products."

Our class secretary wrote for some materials in response to an ad in the newspaper by General Electric Corporation. The materials dealt with

computers in manufacturing. Several nice booklets were sent to us with one in particular being used to develop this concept. It was entitled "How Manufacturers Can Use Computers Best." From this booklet we learned that computer systems designed specifically for the automation of the manufacturing process were now available enabling manufacturers to boost productivity and, therefore, profits. One example cited was the designing of a part needed by a machine used in the automation process by means of a computer which would also show step by step what the machine will then be able to do. It will even show on the video displays views of production that could not be seen by watching the machines produce an item. These materials sent us by General Electric were placed in our Reference Center where our Computer Articles Scrapbook and other limited materials were kept.

At this time I assigned each child to choose something from the Reference Center to read and write a report on. This was to encourage use of the center, to share what was learned with the class, and to again make them aware of the areas of their lives influenced by computers.

To further develop the idea that as automation has increased efficiency more and more, man has become more and more dependent upon computers. Since we pretty well understood that man has found a partnership with computers in many, many, areas of his life, I listed the following three questions on the board:

1. What special job is the computer doing?
2. What new jobs can man do now that a computer is doing his old job?
3. How do you think man's work will change if the computer takes over more and more jobs like these?

I asked the class to think about these questions in relation to our use of Eliza at school. I felt that they could more easily identify with these questions from their (and mine) personal experiences with Eliza.

Kate quickly pointed out that we use Eliza, and our software programs for her, primarily for drill in our basic skills (like when I use flash cards with the class in math.) I pointed out that you might also call her a "tutor" as once we determine what areas a student is weak in, work with Eliza can be assigned in that area. Heather added that since she usually told whomever was using her how well they did when finished, she also, in a way, graded papers. We concluded in answer to the first question then that she did several routine tasks that I as a teacher usually did. As we looked at the second questions they discovered lots of things for me to do with the free time given me by Eliza. Some of the suggestions were - spend more time explaining lessons to the class, teaching them new things, working with individuals more, visiting, grading papers, planning lessons, writing software programs for Eliza, and listening to them and their ideas. I summed up question number three for them by saying "In other words, Eliza would free me from routine work to perform other duties that no machine could ever do." They really enjoyed the thought of Eliza freeing me to spend more fun time with them!"

In preparation for a more controlled experiment on computers' effects on efficiency that I would do with the children later, I brought in an abacus and a calculator which we used in addition to Eliza to work some math problems in a timed control situation. Jill was by far our best math student, winning all our exercises with flash cards and frequently beating Eliza in the drills requiring speed. She was elected to calculate the math problems by hand, and we also had a student to use the abacus, one to use a calculator, and one to operate Eliza. With very simple problems it was easy for Jill working them in her mind and the student using the abacus to finish first but as the problems became harder, the speed with which these two students using manual means of computation was slower,

enabling the calculator and Eliza to finish first.

Now we were ready to try the more controlled experiment with which I intended to show the class how machines increase productivity, the enormous possibilities of electronic technology as a major means of increasing productivity and to dramatize the speed and accuracy with which electronic machines can perform complicated computation and memory operations.

I had access to an excellent kit "Economics for Young Americans Phase 1" put out by the Chamber of Commerce of the U.S.A. It included four film strips with tapes and activity masters for each. The one I particularly liked and that seemed "tailor made" for us was "The Promise of Productivity" we watched the excellent film strip, that developed the idea that American people enjoy one of the highest standards of living in the world and are able to enjoy the things we do in the abundance that we do because we produce more - i.e. We <u>have</u> more because we <u>produce</u> more. (This idea or theme fit in <u>so</u> well with the idea I was trying to develop about the computer's relationship to productivity.) The film concluded with the thought that we all dream of being able to live the good life and increased productivity is the promise that the dream will continue to come true. After viewing this inspiring filmstrip, we did the four activity sheets that accompanied it. The first activity sheet was to assess how they felt about Productivity. (We had discussed productivity at length in developing our glossary and vocabulary game cards, but it was not an idea they all easily grasped.) They were to answer questions about productivity and its meaning and implication by checking boxes indicating their feelings that included strongly disagree, mildly disagree, not sure, mildly agree, and strongly agree. I was amused at how frequently "strongly" was used with "agree" or "disagree" as I very rarely check "strongly" on similar surveys.

Apparently children feel "strongly" about things! It was fun and interesting to discuss their reactions to these questions as a class (several of these sheets are included in the documentation portion of this project)

The next two sheets in this kit included the production of a booklet entitled "Some Historical Facts About Productivity" involving hand-made production of the booklet versus mass production of the booklet. Because we happened to be sitting with all the girls at one set of tables and all the boys at another, we divided our two groups that way. The girls were to produce their booklets including the written material, by hand while the boys were allowed to use duplicated pages that merely had to be assembled. Our workers were divided into a cutter, a sorter, eight assemblers, and a binder. The time each group began their work was noted on the board. There was a great deal of excitement as each group quickly and feverishly completed their assignment. The boys finished in fifteen minutes before the girls and were able to produce eight booklets while the girls took fifteen minutes longer to produce only one booklet. While the boys were extremely proud of their efforts and accomplishments the girls countered with the quality of the products, feeling that their booklet was easier to read. From this activity the class was able to see that increased productivity through mass production lowers the cost per unit of goods or services (the same number of workers was involved in the production of the booklets from each group) improves working conditions, and increases the availability of goods to consumers.

The last activity from this kit, was called "The Mind Expanders" and it emphasized to the class how machines, in particular, electronic machines, increase productivity. Each student was given a work sheet with thirty math problems on it. All the students but three were to work the problems by hand. One student was to use Eliza and two were to use

calculators, and answer as many problems as possible in a five minute period. The results were interesting. Darren, who was by this time our computer expert, used Eliza, and Will and Teresa, who both had calculators at home, used calculators. At the end of the five minutes we stopped and collected some interesting statistics as a result of our experiment. The problems were considered units of production or a service to be rendered to a customer in a business. It was found that Eliza and Darren could produce 94 units in an hour, Will and a calculator could produce 108 units in an hour, Teresa and a calculator could produce 132 units in an hour and most of the individual class members were able to produce only 24-36 in an hour. (We multiplied how many they were able to produce in five minutes by twelve to get the hourly rate.) It was apparent to one and all how machines could have increased the productivity of the class if we had all had either a calculator or a computer. Darren, feeling a little slighted that Eliza didn't help produce as much as the calculators, pointed out that they could produce more units if they had a software program written to handle the data (problems) more efficiently than typing in the problem each time. I was pleased that he made this point as it was just another way of emphasizing technology's contribution to productivity. (These worksheets are included in the Documentation Section of this project.) We concluded the study of this concept with the realization that the electronic or computer age assures continued increases in productivity - which was my main idea behind this whole project. But to us as consumers and producers it also means higher levels of education and training will be required as less skilled and less schooled people will be in less demand in the job market.

Our Concepts Bulletin Board Committee very simply concluded this concept with the Peanut's character, Woodstock, saying "We Are Able to

extend our resources" as Snoopy attacks a huge pile of papers to be processed manually - "when we develop our technology." and Woodstock is happily seated in front of a computer.

INTERDEPENDENCE AND TRADE

(The Contribution Of Others To the Availability Of Computers)

We had watched several films on production and one on International Trade in order to develop this concept. From these films we discussed and I helped the children realize that we are all dependent upon each other for the production of our goods and services.

In viewing a film strip about bakeries and the production of bread they came to realize how many people are involved and how many people we depend on for that loaf of bread - from the farmer who grows the wheat, to the truckers who deliver the wheat to be made into flour, all the way down to the packaging and advertising of the product. The IBM film on computers shown us by Mr. Cordill stressed the fact that a computer is a tool that links people together. Many of our other activities also involved the idea of interdependence.

Brett pointed out that those companies using time sharing facilities of a computer service were dependent upon telephone lines in order to be able to take advantage of this service. Teresa remembered our trip to the telephone company and the fact that computers were involved in linking the telephone system worldwide enabling us to direct-dial overseas numbers.

We were very aware of how we had come to depend on computers in all areas of our lives and the problems we would face in keeping up with needed information without data processing machines.

I asked the children to list as many people or jobs as they could think of who were involved with the production of computers; people we would be dependent upon for the availability of computers. We started with the men who first thought of the idea and Brett reminded us of Mr. Robert Goddard's work with computers in the 1930's. Then we listed the

people who produce them on assembly lines. Kate, reminded us of the entrepreneurs who provide the money so that we have companies to produce computers. Then we listed the people who deliver them to stores to be sold. Next came the people who write and produce ads that let us know of the availability of computers. Brett reminded us that there would be people collecting the sales tax everytime a computer is sold. By this time we began to see that we were interdependent with a lot of people for the availability of computers. Sara wanted to explore the idea of Trade in connection with Interdependence as trade to her was the exchange of "unwanted" items for something else. I had learned at the conference I attended in Phoenix of the importance of the quality chips in the production of computers and how many thousands are thrown away because they are not of good quality. I learned that they are made of silica and the best grade of silica comes from a clay found in Mexico. I decided that I would pursue the idea of trade through this means. I told them the story of the silica used to make the chips. (They had been fascinated by the chips when Mr. Collins showed us one during his visit to our class. We had also turned Eliza's keyboard over enabling us to get a glimpse of her chips.) They knew that the chips were an integral part of computer technology. I reminded them of what Mr. Collins told us about America producing better computers at this point than other countries. Now that we had agreed that Mexico had the silica we needed to produce the chips for our computers, I asked them how we could get the silica from Mexico for this purpose. "Buy it." was one suggestion received. I agreed that we could do that but I asked them to think of anything we have that Mexico might like to have and therefore we might exchange for the silica. They knew from their social studies that Mexico's standard of living was lower than ours and that feeding their population was a problem, so several students suggested food as

a product we could trade with Mexico. Brett, thought they might be particularly interested in our corn as so much of their diet is corn based. I was able to establish the idea that countries do trade with each other in order to supply the wants and needs of their people.

The Bulletin Board Concepts Committee showed the Peanut's character, Snoopy representing a country with computer technology trading with another country for food items and saying "Interdependence creates a need for trade."

ECONOMIC ANALYSIS

(The Five Steps Of Decision Making Used In Deciding On Computer Use)

As mentioned previously, in the section entitled Economics Overview, the children had been introduced to the five steps in decision making through the election of class officers. We had used these steps on several other occasions as we explored the alternatives to homework assignments, the selection of a Christmas play, games to play during Physical Education, etc.

Dee Carroll and his wife Patty are close friends of mine who own a small business called "The Wicker Place". They sell home furnishings, fine gifts, and have a decorating service. Each Christmas a large area of their store is devoted exclusively to a Christmas shop. I work for them during the summers and I knew they were considering buying a computer or using the time sharing services of a computer firm in order to more effeciently manage their inventory. They were already having their mailing list handled by means of a computer. Their daughter, Heather, was in my room and I like to involve parents as resource people whenever possible. I gave Dee the five steps in decision making and asked him to come visit us and use these five steps in showing the children how he would evaluate the worth of a computer to his business. He was an excellent choice for this role as he had at one time worked for a Data Processing firm.

He told us about his business and of the many items they carry for sale. He told us that a business must first reach a certain point - or be large enough to have to remember lots of information, before considering the need for a computer. His business had reached that point now so he thus - Defined his Problem. There were so many items, prices, and other

bits of information about the items he sells at his store that it was too much information for the nine people he has working for him to keep up with manually. He needs to stay current in his business transactions in the areas of pricing and inventory and the manual system he has now is not working.

Next he identified his goal as being able to keep track of his inventory and sales and operate his business in the most efficient and economical way possible.

He now stated several alternatives to consider. He could:

1. Struggle along with the present manual system.
2. Try to improve his present manual system of recording inventory and sales.
3. Hire more people to help manually keep track of inventory and sales.
4. Buy a computer that had the capabilities of keeping up with inventories and sales as well as other capabilities not now needed.
5. Use time-sharing facilities of someone else's computer.

At this point he began to Analyze the consequences of each alternative. If he considered the first alternative and continued the present manual system he would not be meeting his goal of a more efficiently run business. In trying to adopt a new manual system (the second alternative) he would still not be solving his problem of inventory and sales control in the most efficient way. If he considered the third alternative of hiring more personnel to manually do inventory and sales, he would not have room at his store nor the money needed to hire as many people to do the work a computer could do.

In looking at the fourth alternative of buying a computer with the capabilities of doing more than just inventory and sales control a great expense would be involved. By the time we reached the fifth alternative which was using the time sharing facilities of someone else's computer,

the children were able to select this as the best solution in terms of his goals. The expense would be one the business could more easily afford. The inventory and sales could be handled in the most efficient way. (They would not be buying a machine with capabilities that the business did not require at this time.)

After taking the children through these five steps Mr. Carroll spent some time with the class answering other questions relative to his business. Darren wanted to know how his employees would know how to use the computer. Mr. Carroll explained to him that computer businesses will usually train the people that are to operate the machine.

We felt good about our ability to make decisions of any kind based on these five steps in decision-making.

Our Bulletin Board Concepts Committee devised a cartoon strip featuring the Peanuts character "Pig pen" trying to solve his problem of being dirty. He listed his alternatives of bathing, or using deodorant, or just changing clothes. He used his clean, well groomed, friends as the criteria for evaluating the three alternatives which helped him choose taking a bath as the best way to achieve cleanliness.

AN EVENING WITH ELIZA

(A Culminating Activity)

For me, personally, this was the most exciting part of our study. I knew from experience that I could teach children the nine Economic Concepts. I knew they would enjoy working with Eliza and would, by means of this exposure to a computer, achieve a certain degree of computer literacy. In turn, I knew basic skills would be improved as a result of practicing them on Eliza. I also knew that we could explore and learn of the various career opportunities in the area of computers. I knew that I could develop a flexible format and materials that could be used in Economic education for future students. What I did not know was if fourth grade students could learn programming and write an economics software program for our computer.

I wanted the culminating activity to be something that would draw several of the basic ideas we had learned, together. I also like to share our activities with our parents so I wanted to have an open house for our parents and display the activities we had done. I wanted to conclude the evening by having the parents take a multiple choice test on Economics by means of Eliza that would show them,as much as anything, how much we had learned about Economics and perhaps make them aware of their weakness in this area.

My own skills in writing software programs for computers, being limited as they were, made me leery of teaching the children myself. So I called one of our junior high teachers, Lee Easton, who is as big a fan of computers as I. He, too, had used his own money to buy a computer, and was using it, in his advanced math class and teaching them programming. I explained to him that I wanted to choose four of my more capable students and give them

enough instructions in programming that they could write a multiple choice format program about Economics. He had not attempted this with children this young and was as unsure of our success as I was. We did agree to try. He was giving private lessons to individuals for a fee. I paid him $50 to come to our room for six weeks, one day a week, two hours a day after school. I chose Darren, Teresa, Kate, and Sydney to receive the lessons. These students were all excellent readers, (they would be working on their computer assignments during reading time), good math students, (which is necessary in writing programs) and had interested, cooperative parents, who I felt would agree to the after school time and extra efforts this would require. I also felt they would appreciate the opportunity being offered their child by this experience. The kids were excited, curious, motivated and cooperative. In addition to the knowledge we gained in programming, we had fun! I learned right along with them and feel capable of teaching programming to future students. Mr. Easton was excellent with the students. He was thorough and his interest and desire for them to achieve was evident. He gave them weekly assignments in the book, "TRS - 80 Level 11 - Basic", that followed the lesson taught each Monday. They worked on these programming assignments during the reading period in which they normally would have been working on individualized reading assignments. They completed these assignments with very little help from me.

By this time my principal had bought a computer, like Eliza, for our school and very generously offered it to me for use in my room. Having two computers was very helpful at this time as the children worked on their programming assignments.

If they were able to write the program assigned for that particular week with little or no trouble, I would assign them a similar program so that frequently we had extra things to show Mr. Easton on Mondays. They

loved this phase of our study and learned more than Mr. Easton or I expected and with far greater ease than I would have believed they could. In turn they taught most of the children in the room ways to write very simple programs on Eliza. It was interesting to observe the different responses to the instruction of the four children. Teresa, the quietest during lessons, could always answer Mr. Easton's question easiest. Kate, who responded most during the lessons, was the last one to complete her programming assignment in Economics. Sydney, always my most dependable and the most self-motivating child I've ever had, had the most difficulty but also put out more effort than the others. Darren, the most curious and interested in computers was phenomenal! His father, a school administrator, frequently took him to the local Radio Shack store to see the "latest" in computers there. His parents encouraged him a great deal in all areas, this one as well.

After the six weeks of lessons I knew we could handle the hardest part of this whole project! I assigned each of the four children to write ten questions about Economics and four possible answers to each question. I urged them to confer with classmates on possible questions and suggestions. They also used the glossary and Vocabulary Card Game as resources for their answers. When all four had their questions we met as a group and from these forty questions, developed what we called an "E.Q. (Economics Quotient) Test". I did not have the whole class participate in the wording of the E.Q. test as I intended to use it as a means of evaluation for them as well as using it with our parents at Open House. Next the "computer kids", as we called them by now, were given the assignment of writing a program for Eliza that would use a multiple choice format in answering those ten questions. The program would also allow Eliza to give the person taking the test a response as he answered the questions. The program would allow Eliza to

give a percentage of correctly answered questions to the person taking the test as well as any responses that would enliven and make the program interesting. Were they ever successful at this! Because there are so many ways to write a program like this I wanted to see what they each came up with. They all did an excellent job and we were able to combine parts of all four programs into two slightly varied programs to be used at Open House. (I kept my computer and the school's computer in my room all year.) We chose the same ten questions for each program but the format varied a little on each of the two programs.

The children far surpassed my expectations in their ability to write programs. They received absolutely no help from me in completing this assignment. I wanted the program to be theirs. They received their first training in programming in early January and our two programs were completed to our satisfaction in early May. A lot of time and effort and frustration went in to this project but a lot of skill knowledge and maturity resulted. I let the children take turns taking the computers home for a weekend in order to finish their programs. Sydney worked very hard to have hers completed and recorded by Monday morning only to have it inadvertently erased from Eliza's memory. Unless you've had this happen to you, it's hard to imagine the frustration. But it was a valuable lesson in the security precautions needed when using a computer. Sydney readily agreed with the Career Awareness Program worksheet when it listed "patience" as one of the skills necessary for a computer programmer.

Darren became so efficient at proofreading a computer programmer that we heard frequently "Darren, come see what is wrong with this!" He could find functional errors so easily and quickly that it constantly amazed me. Other teachers in my building, including our principal, were taking programming at our local community college as we now had a PET computer as well

as the two TRS - 80's, and they, too, would knock on our door and ask if they could "borrow Darren for a minute."

Word of what I was doing with these children began to spread to others and we were invited to demonstrate the use of computers in education at an Association of Childhood Education meeting. While we used some of the programs that I purchased to demonstrate the way skills could be improved by drill, etc., the most impressive part of the program to our audience was when I asked two of the children to demonstrate their program writing skills, impromptu, by writing a program to fit a situation I described at that moment.

I would then have the two other children alter the program to do something different. I wanted the audience to realize that they had programming skills that were flexible and not so structured and planned as to only be done in a classroom situation with the help of an instructor. We were also invited to present our program to a citywide PTA Council meeting. PTA's at this point, are usually the one's providing the money with which to purchase computers for our schools. After our demonstration, a PTA Board member from another elementary school approached me and said that she had voted against purchasing a computer for her school as she felt it was too expensive and couldn't see its worth. She asked if I would bring my children to their next board meeting and present the same program. She wanted their board to reconsider buying a computer. We did this and the board voted to buy a computer for their school. About this same time Ms. Phyllis Johnson, an instructor at the College of the Ozarks, in Ozark, AR heard about us and asked if she could bring her class in "Economics for Elementary Teacher's" to see what we were doing in the area of Economic Education. They came and spent about two hours with us and from the letter I received from them (see documentation section of this project) "were impressed with

the learning that was taking place." These college students expressed to me that their problem was "Economics was so dry and boring." After visiting with my students and hearing how "much fun" Economics is and seeing some of the activities we do, I think they got some ideas of how to "perk" things up in the teaching of Economics. I also told them of my previous experience with teaching Economics and that the student's responses were the same then - "Economics was fun", so it was not just the computer that made our study fun.

I will now describe specifically our culminating activity "An Evening with Eliza" but because I am so enthused, and in a way, surprised, at the way the children handled their experience in programming, I just had to describe it in such detail.

The night of our Open House, (we had thirty visitors) I had children stationed at each area of the room where some sort of activity or bulletin board or display was shown. The children explained what was represented there and answered questions. They played the games, looked through our materials, and became acquainted with our study and the knowledge we'd gained. Of course no parent was allowed to leave without testing their E.Q. on Eliza. The children enjoyed seeing their parents get a "little apprehensive" about answering these questions!

An activity to sort of "wrap things up for us" that proved to have interesting and surprising results was having the children draw a picture to represent what they enjoyed most about our study.

I expected lots of pictures of Eliza and, there were, but the Vocabulary Cards were also very popular. That they enjoyed an activity that basically involved learning the meanings of words, as much as they did, pleased me.

Our "Evening with Eliza" demonstrated to all, the progress we had made as we learned of Economic implications in our lives. It had been a successful year in more ways than I imagined. I felt this class had more than just

an awareness of Economics but also an idea of how the concepts we developed would influence their world in a complicated future.

The role computers would play in their future was evident in such areas as education, business, medicine, sports, communication, travel, the Arts - in fact there was no area we could think of in which a computer would NOT be involved. As we thought about the future and our careers we felt less apprehension about "electronic machines vs. man" because we had learned to "love our computer."

EVALUATION

Evaluation took place in several ways during our study. Because my primary objective in teaching Economics is that it be a pleasant experience and the fact that more learning takes place under circumstances where the child is involved in activities rather than memorizing facts, I did not use a lot of structured testing methods.

We used a set of duplicating masters on economics that was designed to provide an immediate feedback on what we knew about basic economics concepts. This included a pre and post test.

The Vocabulary Card Game (containing 53 words or phrases and their meaning) which we played daily, for two months was as important in measuring growth in economics learning as any test I could have given. (And a lot more fun and exciting.)

The Test of Elementary Economics (from the Joint Council on Economic Education) was given as a pre and post test. All students showed excellent progress.

The pre test showed a median score of 13 with the highest score being 19 and the lowest score being 7. (I found these scores significantly lower than the scores of the group I had tested before and couldn't help but wonder if it was because the earlier group had participated in an award winning Economic Project when they were second graders.)

I was delighted with the post test scores which revealed a median score of 23 - a gain of 10 points between testing periods. The highest score was an impressive 34 (scored by Kate who had also scored the highest on the pre test) and the lowest score was 15. I found it also interesting the median points reflecting individual growth was 10 with Teresa showing a startling gain of 18 points.

In testing our E.Q. on Eliza we found that of our 16 class members (the four who wrote the program did not take the test) - two scored 100%, three scored 90%, five scored 80%, five scored 70% and one scored 60%.

BIBLIOGRAPHY

Books

Albrecht, Bob; Inman, Don; and Zambra, Ramon, TRS 80 Level II Basic, John Wiley & Sons, Inc. Publisher, 1980

Berger, Melvin, Computers, Coward, McCann, & Logan, Inc. 1972

Campbell, Sally - Our Economic System, Sears Roebuck & Co., 1976

Careers in Computers, Lerner Publications, 1973

Davison, Donald G., Part II Strategies for Teaching Economics, Primary Level, Joint Council on Economic Education, 1977

Goldreich, Gloria and Ester, What Can She Be? A Computer Scientist, Lathrop, Lee, & Shepard Co., 1979

Hansen, W. Lee, Part 1 A Framework for Teaching Economics: Basic Concepts, Joint Council on Economic Education, 1977

Kourilsky, Marilyn, Part II Strategies for Teaching Economics - Intermediate Level, Joint Council on Economic Education, 1977

Medley, Houghton Mifflin Co., 1980

Merrill, Jean, The Toothpaste Millionaire, Houghton Mifflin Co., 1972

Mayers, Peter; Vredeveld, Dr. George; Lewis, John; Harrington, Peter, Choice - Suggested Activities to Motivate the Teaching of Elementary Economics, Educational Service Inc. Publisher, 1975

Nixon, Illa, Editor, Economic Education for Arkansas Elementary Schools, Arkansas State Council on Economic Education and Arkansas Department of Education, Little Rock, AR, 1977

Riedel, Manfred G., A Kid's Guide to the Economy, Englewood Cliffs: Prentice-Hall, Inc. 1976

Simpson, David, Teaching Economic Competence in the Elementary School, Invest in America Council Publisher, 1971

Sprivastava, Jane, Computers, Thomas Crawell Co., 1972

Newspapers

Southwest-Times Record, Southwestern Printing Co., Fort Smith, AR

The Arkansas Gazette, Arkansas Gazette Co., Little Rock, AR

BIBLIOGRAPHY (Continued)

Magazines

Classroom Computer News, published by Intentional Educations.

Highlights
"How to Count Like A Big Computer"
"How to Do Arithmetic Like a Big Computer"

Instructor - February and March 1980
"Classrooms Make Friends with Computers"

80 Micro Computing - February 1981
"Education - A Profound Change"
articles by Jerome Weintraub,
Dr. Lee Droegemueller
Normal Bell
Nancy Robertson

Films

"A Film About Computers" - IBM Corporation

"The Kingdom of Mocha" - Amoco, Inc., Tulsa, OK, Modern Talking Picture Service, Inc., St Petersburg, Fla.

Filmstrips

Banks & Banking

Buttons, Buttons

Call It Wishing

Clarence, The Car

Competition

Dollars & Sense
How Money Goes Round & Round
How Taxes Work
How We Borrow Money

Economics for Young Americans
Promise of Productivity

Economics of Business
Business & Public Interest
Economics & Business Enterprise

Getting & Spending

Government Goods & Services

BIBLIOGRAPHY (Continued)

International Trade

Mass Production

Paper Bags

Private Capital

Profit Motives

The Price Is Right - Or Is It?
Big Sister & The Lemon
Get Your Moneys Worth
Super Snooper
Let's Make a Deal

U.S. Economy in Action
The Role of Capital Investment
The Problem of Capital Investment

We Are All Consumers

What is Economics?

Where We Get Our Goods & Services

You The Consumer
The Commercial
Where Does Your Allowance Go
Blue Jeans, Bubble Gum & Comic Books
It All Works Together

Educational Television Programs

"Adventures of the Mind" (Six Lessons)

"Trade Offs" (Fifteen Lessons)

Field Trips

First Federal Savings & Loan

Fort Smith City Offices

Fort Smith Public School Service Center

BIBLIOGRAPHY (Continued)

Sparks Regional Medical Center

Southwest Times Record Newspaper

Southwestern Bell Telephone Company

Resource People

Mr. Dee Carroll - The Wicker Place, owner

Mr. J.R. Collins - Westark Community College, Data Processing Instructor

Mr. David Cordill - IBM Corporation, Computer Representative

Mr. Lee Easton - Chaffin Junior High, Math instructor (computer programming)

Mr. Pettus Kincannon - A.G. Edwards Company, Stock Broker

Mrs. Lorna Pryor - Westark Community College, Economics & Business Instructor

Pamphlets

Economics for the 80's, Xerox Corporation, 1980

The American Economic System ... and Your Part In It, The Advertising Council & the U.S. Department of Commerce & U.S. Department of Labor, 1978